

Parameter	Value	Unit
Initial concentration	1.0	g/L
Initial pH	7.0	
Temperature	25	°C
Time	0, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536, 131072, 262144, 524288, 1048576, 2097152, 4194304, 8388608, 16777216, 33554432, 67108864, 134217728, 268435456, 536870912, 1073741824, 2147483648, 4294967296, 8589934592, 17179869184, 34359738368, 68719476736, 137438953472, 274877906944, 549755813888, 1099511627776, 2199023255552, 4398046511104, 8796093022208, 17592186044416, 35184372088832, 70368744177664, 140737488355328, 281474976710656, 562949953421312, 1125899906842624, 2251799813685248, 4503599627370496, 9007199254740992, 18014398509481984, 36028797018963968, 72057594037927936, 144115188075855872, 288230376151711744, 576460752303423488, 1152921504606846976, 2305843009213693952, 4611686018427387904, 9223372036854775808, 18446744073709551616, 36893488147419103232, 73786976294838206464, 147573952589676412928, 295147905179352825856, 590295810358705651712, 1180591620717411303424, 2361183241434822606848, 4722366482869645213696, 9444732965739290427392, 18889465931478580854784, 37778931862957161709568, 75557863725914323419136, 151115727451828646838272, 302231454903657293676544, 604462909807314587353088, 1208925819614629174706176, 2417851639229258349412352, 4835703278458516698824704, 9671406556917033397649408, 19342813113834066795298816, 38685626227668133590597632, 77371252455336267181195264, 154742504910672534362390528, 309485009821345068724781056, 618970019642690137449562112, 1237940039285380274899124224, 2475880078570760549798248448, 4951760157141521099596496896, 9903520314283042199192993792, 19807040628566084398385987584, 39614081257132168796771975168, 79228162514264337593543950336, 158456325028528675187087900672, 316912650057057350374175801344, 633825300114114700748351602688, 1267650600228229401496703205376, 2535301200456458802993406410752, 5070602400912917605986812821504, 10141204801825835211973625643008, 20282409603651670423947251286016, 40564819207303340847894502572032, 81129638414606681695789005144064, 162259276829213363391578010288128, 324518553658426726783156020576256, 649037107316853453566312041152512, 1298074214633706907132624082305024, 2596148429267413814265248164610048, 5192296858534827628530496329220096, 10384593717069655257060992658440192, 20769187434139310514121985316880384, 41538374868278621028243970633760768, 83076749736557242056487941267521536, 166153499473114484112975882535043072, 332306998946228968225951765070086144, 664613997892457936451903530140172288, 1329227995784915872903807060280344576, 2658455991569831745807614120560689152, 5316911983139663491615228241121378304, 10633823966279326983230456482242756608, 21267647932558653966460912964485513216, 42535295865117307932921825928971026432, 85070591730234615865843651857942052864, 170141183460469231731687303715884105728, 340282366920938463463374607431768211456, 680564733841876926926749214863536422912, 1361129467683753853853498429727072845824, 2722258935367507707706996859454145691648, 5444517870735015415413993718908291383296, 10889035741470030830827987437816582766592, 21778071482940061661655974875633165533184, 43556142965880123323311949751266331066368, 87112285931760246646623899502532662132736, 174224571863520493293247799005065324265472, 348449143727040986586495598010130648530944, 696898287454081973172991196020261297061888, 1393796574908163946345982392040522594123776, 2787593149816327892691964784081045188247552, 5575186299632655785383929568162090376495104, 11150372599265311570767859136324180752990208, 22300745198530623141535718272648361505980416, 44601490397061246283071436545296723011960832, 89202980794122492566142873090593446023921664, 178405961588244985132285746181186892047843328, 356811923176489970264571492362373784095686656, 713623846352979940529142984724747568191373312, 1427247692705959881058285969449495136382746624, 2854495385411919762116571938898990272765493248, 5708990770823839524233143877797980545530986496, 11417981541647679048466287755595961091061972992, 2283596308329	

9. The method of claim 8 further comprising the steps of:
notifying standby supervisor of the port change state event and the sequence number; and
storing, at the standby supervisor, the second spanning tree port state for the given port and the corresponding sequence number.

1 10. The method of claim 9 wherein the step of executing the consistency check
2 comprises the step of comparing the one or more sequence numbers stored by the ports
3 with the sequence number stored by the standby supervisor.

1 11. The method of claim 9 further comprising the steps of:
2 clearing each port change state event upon directing the given port to change
3 spanning tree port states;
4 in response to the failure at the active supervisor, designating any port change
5 state events not cleared by the failed active supervisor as open events; and
6 for each open event:
7 storing, at the standby supervisor, the second spanning tree port state for
8 the given port; and
9 directing the given port to change spanning tree port states as specified in
10 the open event.

1 12. The method of claim 1 wherein, in response to the failure at the active super-
2 visor, the standby supervisor elects the at least one root and directs the ports to transition
3 among the spanning tree port states.

1 13. The method of claim 12 wherein the step of running the spanning tree proto-
2 col at the standby supervisor comprises the steps of:
3 generating a plurality of configuration bridge protocol data unit (BPDU) mes-
4 sages; and
5 forwarding the BPDU messages from the ports of the network device,
6 wherein the BPDU messages include a Topology Change (TC) flag field, and the
7 TC flag field is asserted.

1 14. The method of claim 4 wherein the non-forwarding spanning tree port state of
2 the transitioning step is one of blocking and listening spanning tree port states.

20. The intermediate network device of claim 19 further comprising means, responsive to a crash or failure at the active supervisor, for designating the standby supervisor to be a newly active supervisor, whereby, in response to the crash or failure at the active supervisor, the newly active supervisor elects the at least one root and directs the ports to transition among the spanning tree port states.

3 a first event manager disposed at the active supervisor, the first event manager
4 configured to generate port change events in response to the ports transitioning from a
5 current spanning tree port state to a new spanning tree port state;

7 means for passing the port change events from the first event manager to the sec-
8 ond event manager.

22. The intermediate network device of claim 21 wherein each port change event generated by the active event manager identifies the respective port and the new spanning tree port state.

23. The intermediate network device of claim 17 whereby the active supervisor
does not inform the standby supervisor of the at least one elected root within the com-
puter network.

24. A computer readable medium containing executable program instructions for
continuing operation of a spanning tree protocol (STP) despite crashes or failures at an

1 29. The intermediate network device of claim 28 further wherein
2 in response to a detection of a crash or failure at the active supervisor the standby
3 supervisor is designated to be a newly active supervisor, and
4 the STP engine at newly active supervisor elects the at least one root and directs
5 the ports to transition among the spanning tree port states.